

Snails and Other Invertebrates from Indian Village Sites, Principally Contra Costa County, California

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IN 1957 THE SENIOR AUTHOR described *Speleodiscoides spirellum*, a new snail genus and species from North America (SMITH, 1957). The description was based upon specimens collected in two limestone caves in Amador County, California, by speleologists of the Stanford Grotto National Speleological Society. The typical adult specimen has a small, tightly-coiled, flat, whitish shell with six to seven whorls and is one-quarter of an inch in diameter. No living snails of this species have as yet been found.

The species is of special interest because it had been collected sparingly in the San Francisco Bay region as early as 1872 by the western naturalist C. D. Voy, and later by the ornithologist W. Otto Emerson, and the conchologist Professor William J. Raymond of the University of California. In at least one instance shells were reported in an Indian mound (SMITH, 1957: 37). There are no records of occurrence between the localities reported in the San Francisco Bay region and those in the limestone caves of Amador County — a curious instance of discontinuous distribution that is not usual with species of California land snails.

The finding of *Speleodiscoides spirellum* recently during the excavation of three Indian village sites in Contra Costa County by the junior author, an archeologist, and her colleague, David A. Fredrickson, therefore seems worth reporting, considering the relative rarity of shells of the species in museum collections. Data from the three archeological sites are as follows:

CCo-309. Site in Walnut Creek, Contra Costa County, California, on the east side of Tice Creek, two miles from downtown Walnut Creek. The specimens were collected from a special excavation unit, S-36, that received fine screening ($\frac{1}{8}$ inch mesh) and laboratory sorting. The pit yielded cultural material to about 24 inches. The remains

of a child's cremation were recovered in a sub-midden pit in S-36, which was located in an area where other cremations and burials were found. Grave offerings of shell artifacts, most of them burned, consisted of *Olivella biplicata*, *Saxidomus nuttalli*, and *Haliotis sp.* beads and ornaments (the site is archeologically dated in the Late Horizon, 1500 to 1790 A. D.). Remains of mollusca used for food were plentiful in the midden, the most common being *Mytilus edulis*, *Macoma nasuta*, and *Ostrea lurida*.

Of the total of ten snails recovered in S-36, three were found at 12 to 18 inches, one at 18 to 24 inches, five at 24 to 30 inches (and here we entertain the possibility that they were dispersed cremation material) and one in the sub-midden cremation material itself at 30 to 35 inches below surface.

The snails were also observed in other cremation and burial areas during excavation, but were not collected. In other parts of the site, where such features were absent, the snails were not recorded as being present.

The ten dead, bleached *Speleodiscoides spirellum*, adult or nearly so, were accessioned in the California Academy of Science, Department of Geology Collection, Loc. No. 38823. Other land snails taken from unit S-36 include one dead adult specimen of the small, carnivorous *Haplotrema durantei continentis* H. B. BAKER (C. A. S. Geology Coll. Loc. No. 38822), a single dead shell of *Helminthoglypta nickliniana bridgesi* (NEWCOMB), two dead adult *H. diabloensis* (COOPER), and several dead juveniles, probably of one or both of these latter species. Also identified were examples of the common sessile barnacle, *Balanus nubilus*, which were observed attached to many of the *Mytilus* shells mentioned above.

CCo-308. Site at Alamo, on the west side of the then existing channel of San Ramon Creek, Contra Costa

County, California. While numerous land snails were seen during excavation, only a sample was retained for analysis and identification.

The material from this small sample consisted of two fragments of the freshwater mussel, *Margaritifera margaritifera falcata* (GOULD) and three small dead, bleached land snails. Two of the snails are *Speleodiscoides spirellum* (C. A. S. Geol. Coll. Loc. No. 38822); the third is a very young *Helminthoglypta* cf. *H. diabloensis* (COOPER).

The snails were recovered in a burial area of the site at depths from 45 to 60 inches below the surface (Note: At least 12 inches at the surface was recent alluvium. The archeological context provides a date of about 100 B. C. to 300 A. D.).

CCo-30. The third site in the same general area is located one-half mile south of CCo-308 and is also in the community of Alamo. Sorting of the shell refuse produced five dead shells of *Speleodiscoides spirellum* (C. A. S. Geol. Coll. Loc. No. 38826). Three of the five were recovered in or near burials; one lay in the top 0 to 6 inch-excavation level; and the fifth was found in an area of concentrated food-shell debris.

Recovered also at CCo-30 were fragments of the whale barnacle (*Cryptolepas rachianecti* DALL), described in 1872 from specimens imbedded in the flippers of a California Gray Whale (*Eschrichtius glaucus*). The presence of these fragments in an Indian village in interior Contra Costa County presents an interesting archeological problem.

Also of interest is the occurrence of the dead shells of *Haplotrema durantei continentis* H. B. BAKER in fair quantity in an Indian village site (Lak-261), located two miles south of Lower Lake, near Copsey Creek, in Lake County, California. The site was excavated by Fredrickson in 1961; dating of the site has as yet not been completed. In this instance the shells were found in the $\frac{1}{8}$ inch screenings to a depth of 36 inches in a cemetery area. The frequency of occurrence of the shells generally decreased with depth. (These shells have also been accessioned in the C. A. S. Geol. Coll. Loc. No. 38824.)

The finding of dead snails in Indian village sites is cause for speculation. As MATTESON (1959) points out, one possible theory can be based on the fact that all snails need a certain amount of lime for building their shells. Therefore, they might gravitate naturally to a location where the lime content in the soil is greater. In an Indian village site containing the remains of marine and fluvial shells brought in for food, decoration, or whatever other purposes, the lime content would be higher than in the surrounding area. Land snail collectors nearly always find more interesting and better collecting in limestone areas. As the snails in question are not known ordinarily to be deep burrowers, even when in estivation, an explanation

for their occurrence as deep as five feet must be sought.

It is apparent that the smaller snail shells, which are delicate and light in weight, are late intruders in the sites. In the contexts described above they would have tended to disintegrate after any extended period of time unless a special situation existed leading to actual fossilization, which is evidently not found at the cited localities. At sites CCo-308 and Lak-261 shell beads and ornaments, deriving from the same depths as most of the snails, were found badly corroded; and these decorative items were made from much harder shells.

If the occurrence of the snails at the depths reported is due to fortuitous causes, two possibilities can be suggested: 1) they fell down rodent burrows, and 2) they were transported by the re-working of the soil over a considerable period of years by small burrowing mammals. The high incidence of rodent activity in softer soils of archeological sites has often been noted in the literature.

It can also be suggested that the live snails used open burrows to reach specific types of localities as is indicated in the sites described above. However, it must be pointed out that exceptional care is taken both in the field and laboratory with material from burial and cremation areas. This special attention may weight the picture somewhat in favor of locating the small snails in these areas.

This occurrence of *Speleodiscoides spirellum* raises other questions for which answers need to be sought. Why is it, in a period of about ninety years, during which there has been more or less assiduous collecting of land snails in central California, that this species has been taken only four times, the present occurrence being the fifth? Why should it be so rare? Why should it turn up in such an assortment of widely separated localities? Why has it not yet been found living? Are we in this instance dealing with a relict genus and species that, for some unknown reason, has not been able to adjust to possible changes in ecological conditions and is practically at the point of extinction?

At least three facts about this rare shell can be stated with some confidence. One is that the shells found to date are not fossil, although earlier malacologists thought they might be. Another is that with more diligent collecting in the limestone areas of California's Mother Lode it possibly can be discovered alive. A third is that the species in all probability is indigenous and not adventitious. Nothing quite like it has ever been reported, at least from North America, although South American species seem to be close in appearance, if not definitely related morphologically.

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LITERATURE CITED

BAKER, FRANK COLLINS

1930. The use of animal life by the mound-building Indians of Illinois. *Trans. Illinois Acad. Sci.* 22: 41 - 64.

MATTESON, MAX R.

1953 a. Fresh-water mussels used by Illinoian Indians of the Hopewell culture. *The Nautilus* 66: 130 - 138; 67: 25 - 26.

1953 b. Land-snail shells found in a kitchen midden of Illinoian Indians of the Hopewell culture. *Trans. Illinois Acad. Sci.* 46: 208 - 211.

1959. Snails in archaeological sites. *Am. Anthropologist* 61 (6): 1094 - 1096.

SMITH, ALLYN GOODWIN

1957. Snails from California caves. *Proc. Calif. Acad. Sci.* 4th Ser., 29 (2): 21 - 46; pls. 1, 2. (28 January)

NOTES & NEWS

The Department of Invertebrate Zoology of the California Academy of Sciences

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THE DEPARTMENT OF INVERTEBRATE ZOOLOGY of the California Academy of Sciences in San Francisco has established a new repository for type specimens of marine, land, and freshwater invertebrates preserved in alcohol or formalin. The need for such action became apparent upon reactivation of the Department in July, 1960, with responsibility for the curation and systematic arrangement of the Academy's large and steadily growing collection of invertebrates, including a number of types.

Preserved invertebrate type specimens of both primary and secondary rank are deposited in the new type series. Types are numbered serially, regardless of phylum, beginning with No. 1. A detailed card catalogue is maintained covering all pertinent data including citations to publications. Cards are filed alphabetically, by species, and include references to case and tray location.

Larger invertebrate types are curated in accordance with department standards in suitable-sized glass containers with a hard, plastic (or other) closure and a thin polyethylene insert to inhibit evaporation. Smaller specimens will be: (a) sealed permanently in glass tubing

with a contained label; or (b) placed in standard containers in long-style shell vials plugged with cotton and placed into the containers upside down.

Microscope slide mounts relating to invertebrate types are filed separately in standard plastic slide boxes, 100 slides to a box. These are stored with the slides horizontal to prevent possible drifting of the mount. Mounted serial sections of a type animal, or a part of it, will carry a single file number that has been assigned to the rest of the animal, if preserved separately.

Recent mollusk types preserved dry will continue to be deposited in the Academy's Geology Type collection. Invertebrate types, other than mollusks, which are preserved dry, will be given special storage treatment.

Specialists in invertebrate phyla are invited to deposit type specimens in the Academy's Invertebrate Type Series. They can have the assurance that their material will be handled and stored with care, with adequate provisions for future safety and security. Specimens in this Type Series may be studied by experts and qualified students upon advance arrangement with the Department's Curator.

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A. M. U.

Pacific Division

THE SEVENTEENTH ANNUAL MEETING of the American Malacological Union, Pacific Division, is to be held this year June 18 to 21 (Thursday to Sunday), inclusive, at Asilomar Conference Grounds, Pacific Grove, California. Already the program is beginning to take shape: a film is promised, on shellfish management in Europe; and two paleontologists who are taking part in marine expeditions this winter and spring have agreed to report on their experiences in the Indian Ocean and the Galapagos Islands.